$y = \frac{a}{x}$

a is pos:

Branches are in Quadrants I and III

a is neg:

Branches are in Quadrants II and IV

a is large:

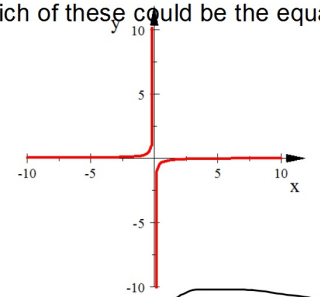
Branches are pushed further from the origin

a is small:

Branches are brought closer to the origin

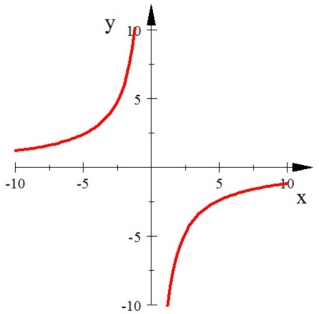
Turn on your ActivExpressions.

Which of these could be the equation of this graph?



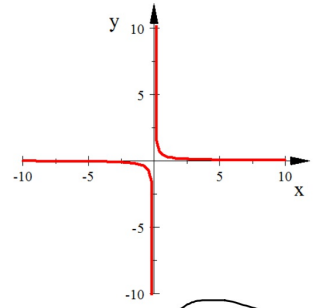
A. $y = \frac{-4}{x}$ B. $y = \frac{-0.2}{x}$ C. $y = \frac{0.1}{x}$ D. $y = \frac{9}{x}$

Which of these could be the equation of this graph?



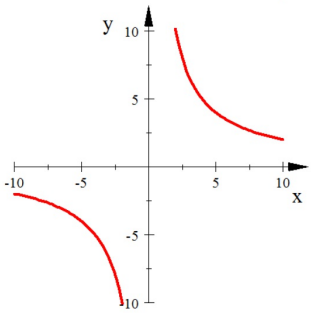
A. $y = \frac{0.35}{x}$ B. $y = \frac{8}{x}$ C. $y = \frac{-0.4}{x}$ D. $y = \frac{-12}{x}$

Which of these could be the equation of this graph?



A. $y = \frac{-7}{x}$ B. $y = \frac{0.3}{x}$ C. $y = \frac{16}{x}$ D. $y = \frac{-0.5}{x}$

Which of these could be the equation of this graph?



A. $y = \frac{0.25}{x}$ B. $y = \frac{-13}{x}$ C. $y = \frac{20}{x}$ D. $y = \frac{-0.1}{x}$

Enter this equation into the calculator: $Y_1 = \frac{1}{x}$

Using the TABLE function on the calculator enter bigger and bigger numbers for X. What happens to the value of Y?

As x gets bigger and bigger pos y gets smaller pos (closer to zero)

As you move further to the right the graph gets closer to the x-axis(y=0)

As x gets bigger and bigger neg y gets smaller neg (closer to zero)

As you move further to the left the graph gets closer to the x-axis (y=0)

End Behavior

Enter this equation into the calculator: $Y_1 = \frac{1}{x}$

Using the TABLE function on the calculator enter numbers for X that are closer and closer to zero (smaller and smaller). What happens to the value of Y?

As x gets smaller and smaller (pos) y gets larger and larger (pos)

As you get closer and closer to the Vertical Asymptote from the right side (smaller positive x values) graph goes higher and higher (increases without bound).

As x gets smaller and smaller (neg) y gets larger and larger (neg)

As you get closer and closer to the Vertical Asymptote from the left side (smaller negative x values) graph goes lower and lower (decreases without bound).

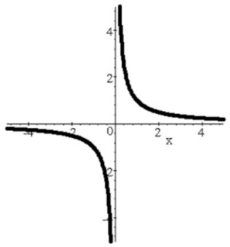
As you approach a Vertical Asymptote the graph will either

INCREASE WITHOUT BOUND (go higher and higher)

or it will

DECREASE WITHOUT BOUND (go lower and lower)

Asymptotes for the Reciprocal Function:



$$y = \frac{1}{x}$$

Horizontal Asymptote: the x-axis $y = 0$

Vertical Asymptote: the y-axis $x = 0$

How has $y = x^2$ been translated to create the parabola from the equation below?

$$y = a(x - h)^2 + k$$

What are the coordinates of the vertex? (h,k)

a represents a vertical stretch or shrink
and possibly an x-axis reflection.

h represents a horizontal translation

k represents a vertical translation

How could you change the Vertical Asymptote of $y = \frac{a}{x}$?

Shift the graph left or right $y = \frac{a}{x - h}$

VA: $x = h$

How could you change the Horizontal Asymptote of $y = \frac{a}{x}$?

Shift the graph up or down: $y = \frac{a}{x} + k$

HA: y = k

Transformations of the Parent Function $y = \frac{1}{x}$

$$y = \frac{a}{x-h} + k$$

$a > 0$
Branches in Quadrants I and III

$a < 0$
Branches in Quadrants II and IV
(x-axis reflection)

h :
Horizontal Translation
VA: x = h

k :
Vertical Translation
HA: y = k

$0 < a < 1$
Vertical Shrink
Branches closer to the origin

$a > 1$
Vertical Stretch
Branches further from origin